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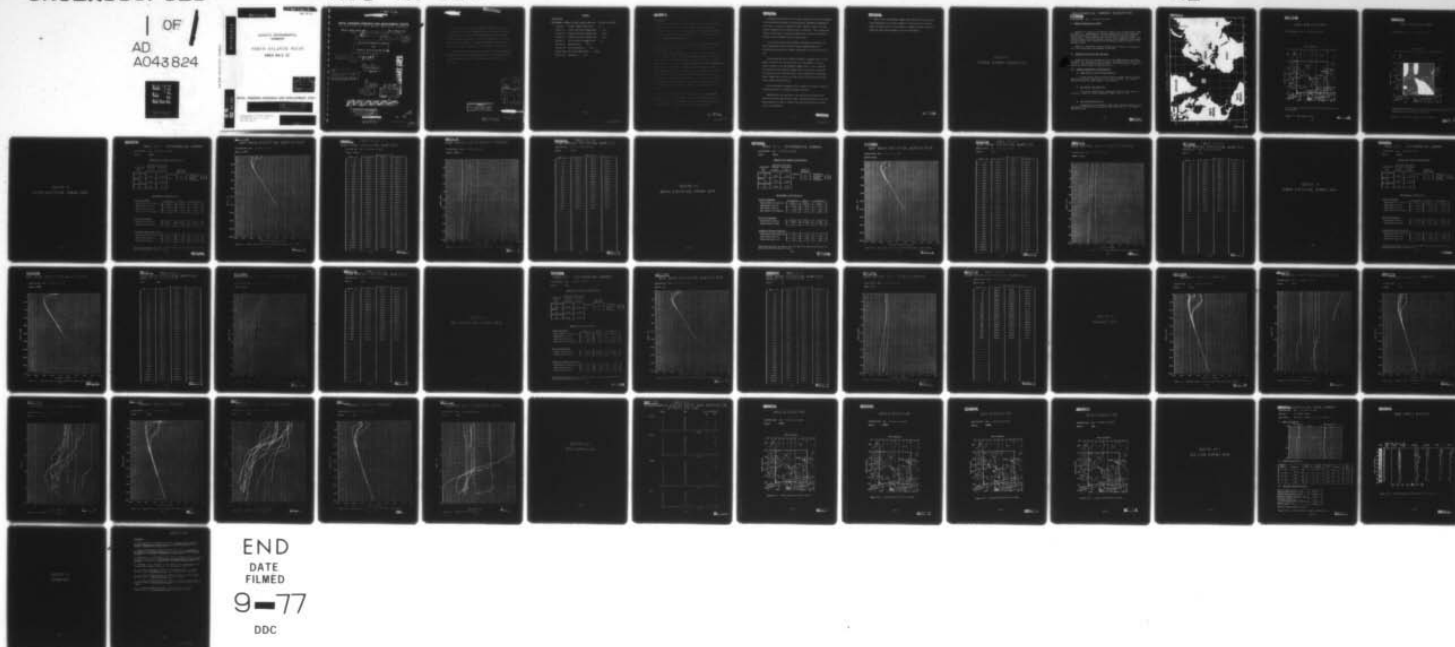
NAVAL UNDERSEA RESEARCH AND DEVELOPMENT CENTER SAN D--ETC F/G 20/1
ACOUSTIC ENVIRONMENTAL SUMMARY FOR NORTH ATLANTIC OCEAN AREA NA--ETC(U)
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NAVAL UNDERSEA RESEARCH AND DEVELOPMENT CENTER

An activity of the Naval Material Command

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Technical Director

14 NHC-TN-213

9 Technical Notes

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ACOUSTIC ENVIRONMENTAL SUMMARY
FOR
NORTH ATLANTIC OCEAN AREA NA-2.

16 F11121, ZR0001

10 BY
JOHN J. RUSSELL
CODE 556

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ZR1110101

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This technical note presents summary oceanographic data which has been generated by the Performance Modeling and Operations Analysis Division, Code 556, of the Naval Undersea Research and Development Center, San Diego. This note is not to be considered as an official NUC report. Its purpose is to document environmental studies which are being carried out in support of current Navy ASW acoustic studies.

The work described in this technical note has been supported under NAVSHIPS Exploratory Development subproject SF 11-121-500, Task 8704, and by Independent Research funds under subproject ZR 011 01 01, Task 0401.

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INTRODUCTION

This report forms a part of a continuing series of reports published by Code 556 to provide acoustic system oriented users a concise but comprehensive analysis of acoustically significant oceanographic parameters. The analysis approach and a detailed description of the methods employed appears in NUC Technical Paper No. 115.

→ This report presents a seasonal oceanographic environmental summary for North Atlantic area NA-2. Figure 1.1 shows the region from which data was taken for this analysis.

→ over the Mid-Atlantic Ridge -- 50-55 deg N x 30-35 deg W.

→ The contents of this environmental summary represent a statistical cross section of the conditions which can exist in this region. Velocity structure data resulted from an analysis of Nansen cast and bathythermographic data from the Code 556 digital oceanographic data bank, which includes 260,000 Nansen Cast stations and 304,000 BT stations. Additional environmental data from Code 556 files, NAVOCEANO publications and from various other sources provided additional information. Special Code 556 computer processing programs, which determine layer depth, gradients, and other profile characteristics, were used in carrying out the velocity profile analysis.

Data generated for this report is primarily for use by NUC system analysts in selecting environmental inputs to sonar system performance predictions. They are also available to other Navy activities requiring information of this type in support of system analysis studies.

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Sufficient data exists so that a high confidence level can be assigned to the statistical validity of velocity profile information presented in this report. We may also establish a high confidence level in the sea surface parameters since sufficient data is available. Lack of good data limits our knowledge of scattering coefficients, and we must therefore ascribe a lower confidence level to these values.

Core and other ocean bottom sediment information provided by the Marine Geophysical Survey and other surveys furnished data for a satisfactory description of acoustic properties of the sea floor in the area.

Values appearing in the Statistical Quartile Summary Tables are not always consistent with the layer depth (ZL) and gradient (γ_0 and γ_1) values presented in the Environmental Summary Table. This is expected since the Statistical Quartile Summary Table values result from using all station data sets available, while values appearing in the Environmental Summary Table utilize only those station data sets which display surface channel characteristics.

These environmental summaries will be updated at periodic intervals as additional data or information becomes available.

Depending upon the application, the acoustician utilizing these statistical profiles may desire to make a slight modification of the near surface profile in order to exhibit the sound channel which he desires to use in his analysis.

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Users of this environmental summary must realize that all parameter values appearing in this report represent a cross section of possible values one might expect to occur based on a complete review of available historical data and consideration of local area dynamics.

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SECTION I
GENERAL SUMMARY DESCRIPTION

ENVIRONMENTAL SUMMARY DESCRIPTION

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LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

I. GENERAL DESCRIPTION OF REGION:

Area NA-2 is located in the Northern Atlantic over the mid-Atlantic Ridge. See Figure I.1. Physiographic Provinces represented are the Rift Mountains and the High Fractured Plateaus, both east and west of the Rift Mountains. Bottom relief is highly variable and the ocean floor is generally rough. The northern branch of the North Atlantic current flows through this ocean expanse and carries water which represents Gulf Stream water mixed with waters of the Labrador Current.

Figure I.2 outlines the specific analysis area. Figure I.3 illustrates the ocean bottom relief and roughness in the area.

II. TECHNIQUE OF ANALYSIS AND DATA BASE:

Sufficient data are available for winter and summer seasons, but during spring and fall the amount of data is sparse. See Figures VII.1, VII.2, VIII.3, and VII.4. The statistically generated deep ocean velocity profiles appear to exhibit the general shapes of actual profiles.

III. SUMMARY OCEANOGRAPHIC CHARACTERISTICS:

A. SOUND VELOCITY PROFILE CHARACTERISTICS:

Sound velocity profiles reflect seasonal changes with well defined deep surface channels occurring most of the time in winter. Much shallower channels dominate the summer season. See Section VI.

B. SEA SURFACE CHARACTERISTICS:

Sea surface characteristics adequately define the four seasons in this area. Annual sea surface temperature range is 44°F to 60°F.

C. SEA FLOOR CHARACTERISTICS:

Dominated by the mid-Atlantic Ridge system the bottom depth exhibits considerable variability but is generally less than 10,000 ft. See Figure I.3 and Section VIII.

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GENERAL AREA LOCATION

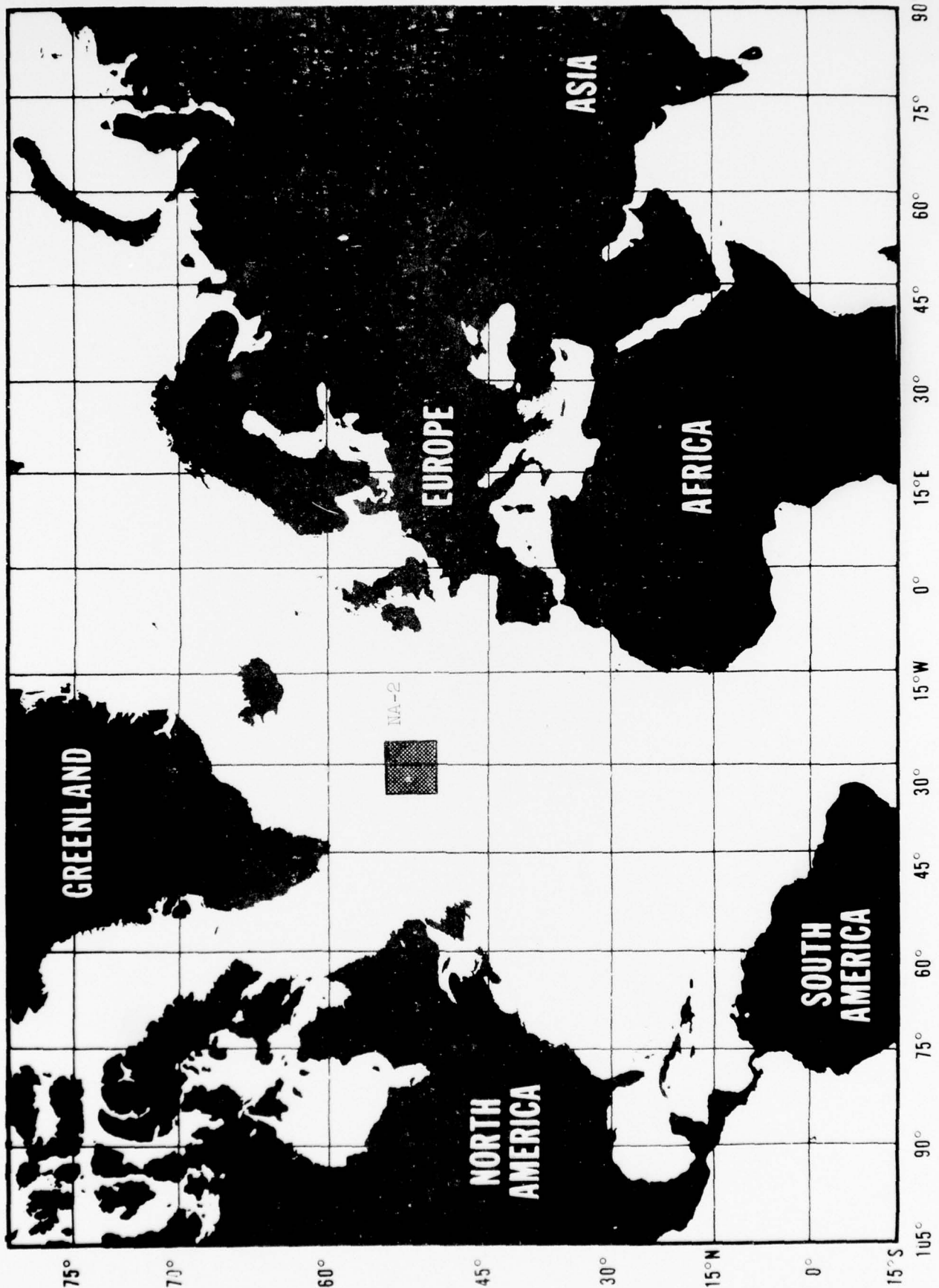


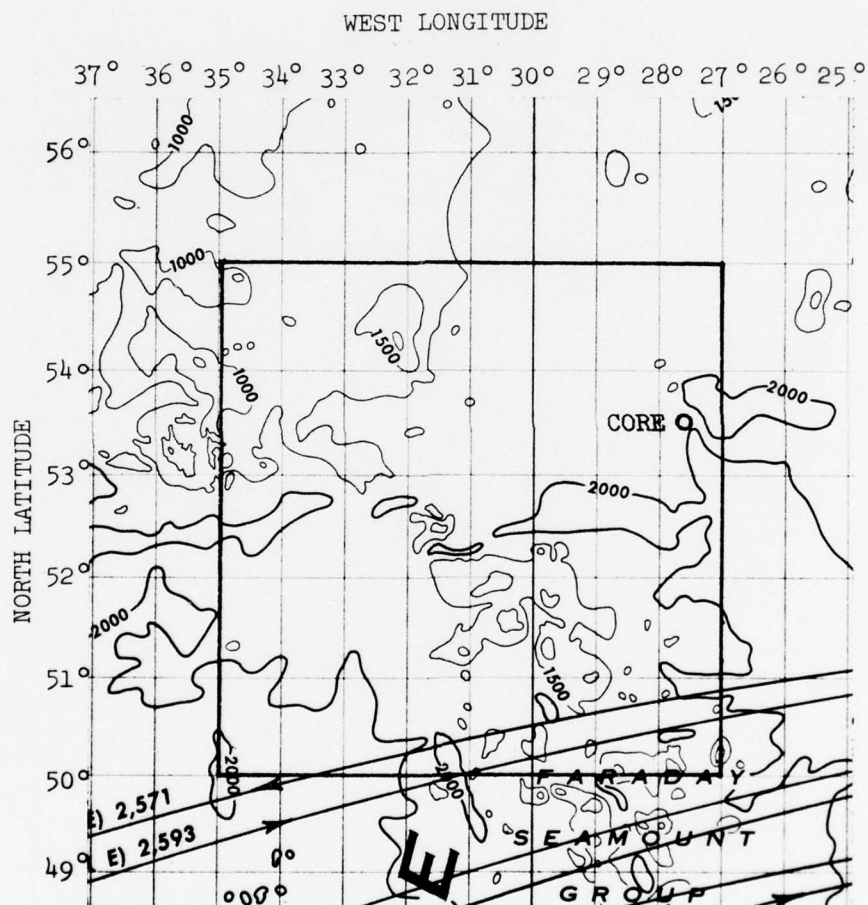
Figure I.1. Location of area NA-2.

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DATA ANALYSIS AREA

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W



Core and Nansen Cast data are located within area enclosed by rectangle.

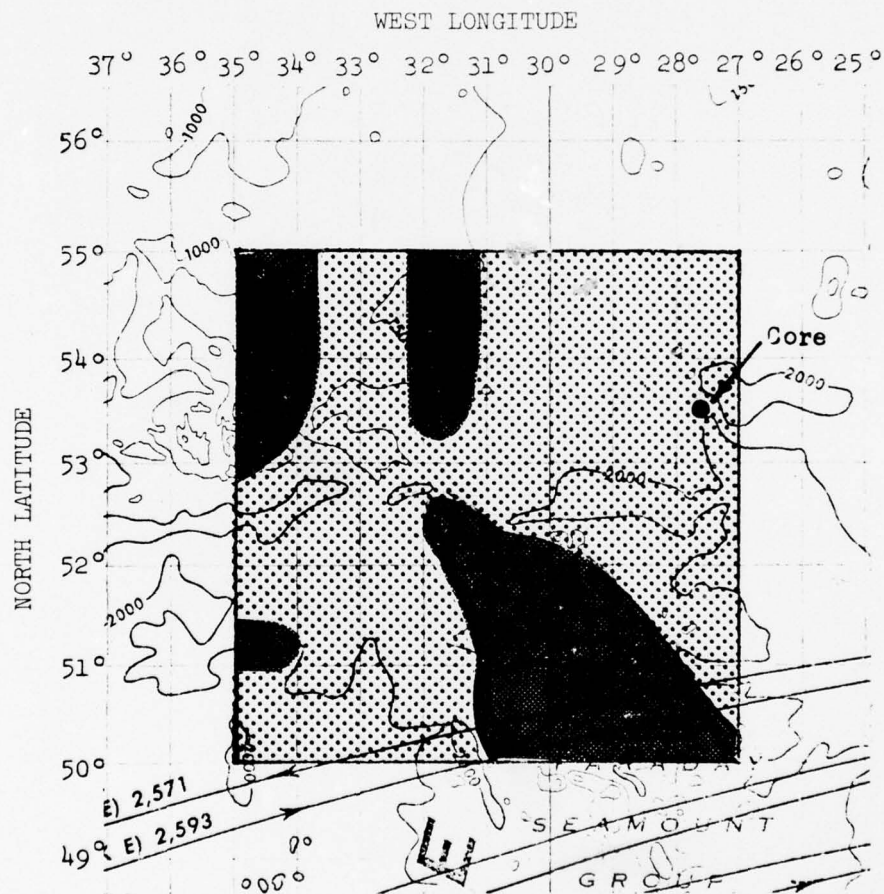
Figure I.2. Data analysis area

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DATA ANALYSIS AREA

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W



Cross hatching indicates areas rough areas with bottom slope > 6 degrees. Dotted area is representative of reasonably smooth region having a high distribution of bottom scatterers.

Figure I.3. General bottom relief and roughness.

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SECTION II
WINTER STATISTICAL SUMMARY DATA

II.1

CONFIDENTIAL**TABLE II.1 ENVIRONMENTAL SUMMARY**

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: WINTER

SURFACE SOUND CHANNEL CHARACTERISTICS

ASSOCIATED GRADIENTS*

LAYER DEPTH (ZL) (FT)	IN-LAYER (γ_0) (FT/SEC/FT)	BELOW-LAYER (γ_1) (FT/SEC/FT)
-----------------------------	---	--

1ST QUARTILE		
254	.0150	-.0618
MEDIAN		
374	.0159	-.0554
3RD QUARTILE		
637	.0162	-.0438

STATION

BT

AMOUNT OF
DATA USED

31
13

PROBABILITY
OF SURFACE
CHANNEL
OCCURRENCE

>90%

ENVIRONMENTAL CHARACTERISTICSSURFACE PARAMETERS

	1ST QUARTILE	MEDIAN	3RD QUARTILE
SOUND VELOCITY (CS)(FT/SEC)	4852.7	4883.0	4903.4
TEMPERATURE (SST)(°F)	44.8	48.9	52.0
WAVE HEIGHT (LWA)(FT)	1.0	7.3	12.8
WIND VELOCITY (VWI)(KNOTS)	13.8	22.0	29.4

SEA FLOOR PARAMETERS

BOTTOM DEPTH (ZBM)(FT)	8800	10,800	11,500
BOTTOM POROSITY (PORB)	.71	.76	.80

SCATTERING STRENGTH PARAMETERS

OCEAN BOTTOM (MUB)(dB/SQ YD)	-20	-17	-14
LAYER (MUVL)(dB/CU YD)	-75	-69	-58
VOLUME (MUV)(dB/CU YD)	-75	-70	-65

*Associated gradients are medians for that 50% of the data centered about the specified layer depth quartile values.

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DEEP OCEAN STATISTICAL QUARTILE PLOT

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: WINTER

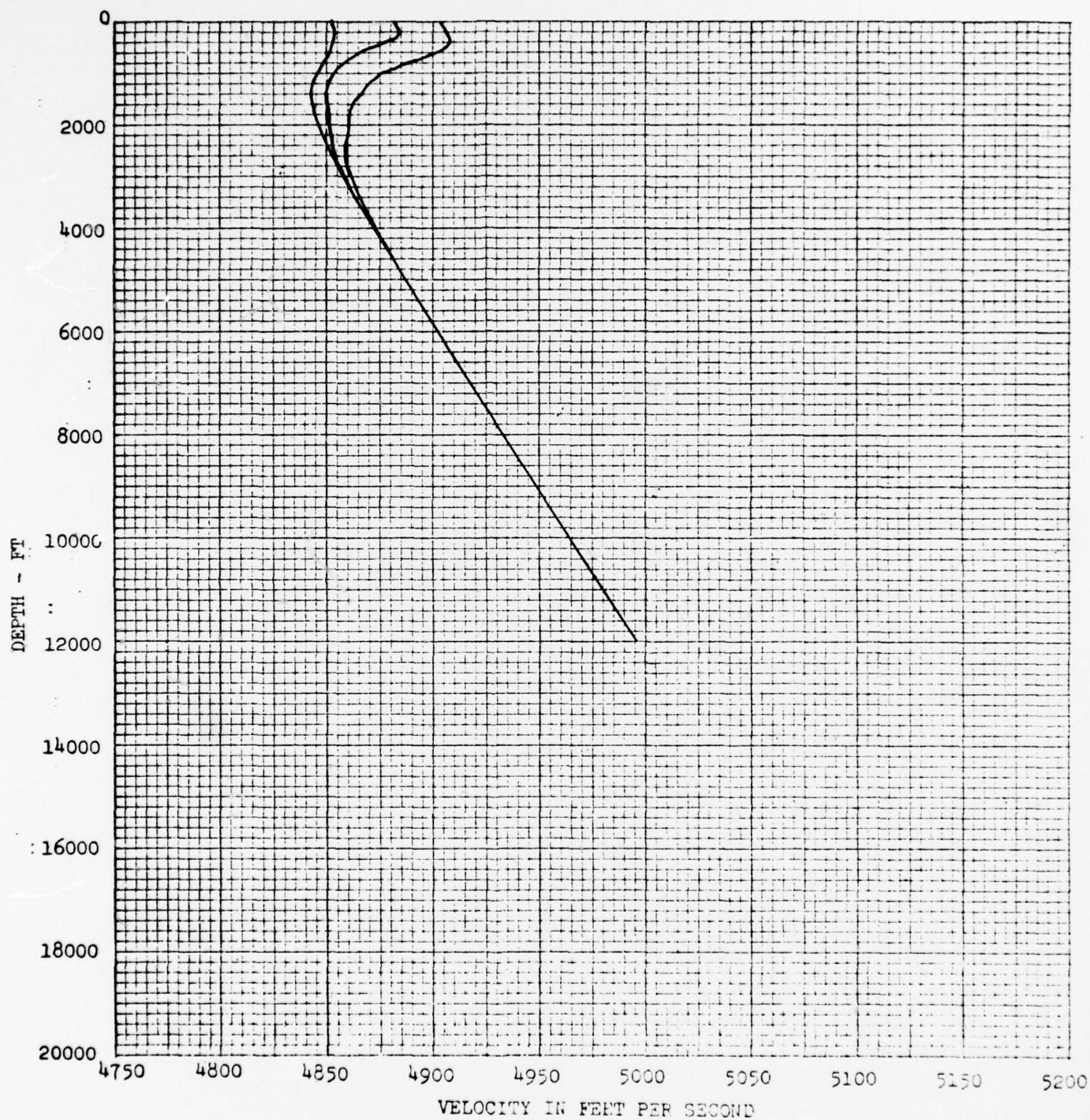


Figure II.1. Deep ocean sound velocity statistical quartile plot, winter.

II.3

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CONFIDENTIALTABLE 11.11
DEEP OCEAN STATISTICAL QUANTILES

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: WINTER

DEPTH - FT	SOUND VELOCITY - FPS		
	1ST QUANTILE	MEDIAN	3RD QUANTILE
0	4852.7	4881.8	4903.4
200	4854.4	4884.5	4906.8
400	4853.1	4877.4	4908.8
600	4850.9	4865.2	4901.1
800	4848.5	4857.7	4888.0
1000	4846.2	4853.7	4875.4
1200	4843.6	4850.5	4869.7
1400	4843.3	4849.5	4866.2
1600	4843.6	4850.4	4862.2
1800	4845.0	4850.8	4861.1
2000	4847.0	4850.8	4860.8
2200	4848.9	4851.3	4860.4
2400	4850.7	4852.4	4859.8
2600	4852.6	4854.1	4859.0
2800	4855.1	4856.6	4859.9
3000	4857.6	4859.0	4861.4
3400	4862.6	4863.5	4865.6
3800	4868.4	4869.3	4870.7
4200	4874.5	4875.1	4876.3
4600	4880.4	4881.0	4882.1
5000	4886.4	4887.2	4887.5
5400	4892.6	4893.4	4893.9
5800	4898.7	4899.2	4900.2
6200	4904.8	4906.0	4906.5
6600	4910.9	4912.2	4912.8
7000	4917.0	4918.2	4919.1
7400	4923.1	4924.2	4925.5
7800	4929.3	4930.2	4931.8
8200	4935.4	4936.2	4938.2
8600	4942.0	4942.7	4944.4
9000	4948.5	4949.3	4950.7
10,000	4965.5	4965.6	4965.6
11,000	4980.9	4980.9	4980.9
12,000	4996.3	4996.3	4996.3

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NEAR SURFACE SOUND VELOCITY PROFILE

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: WINTER

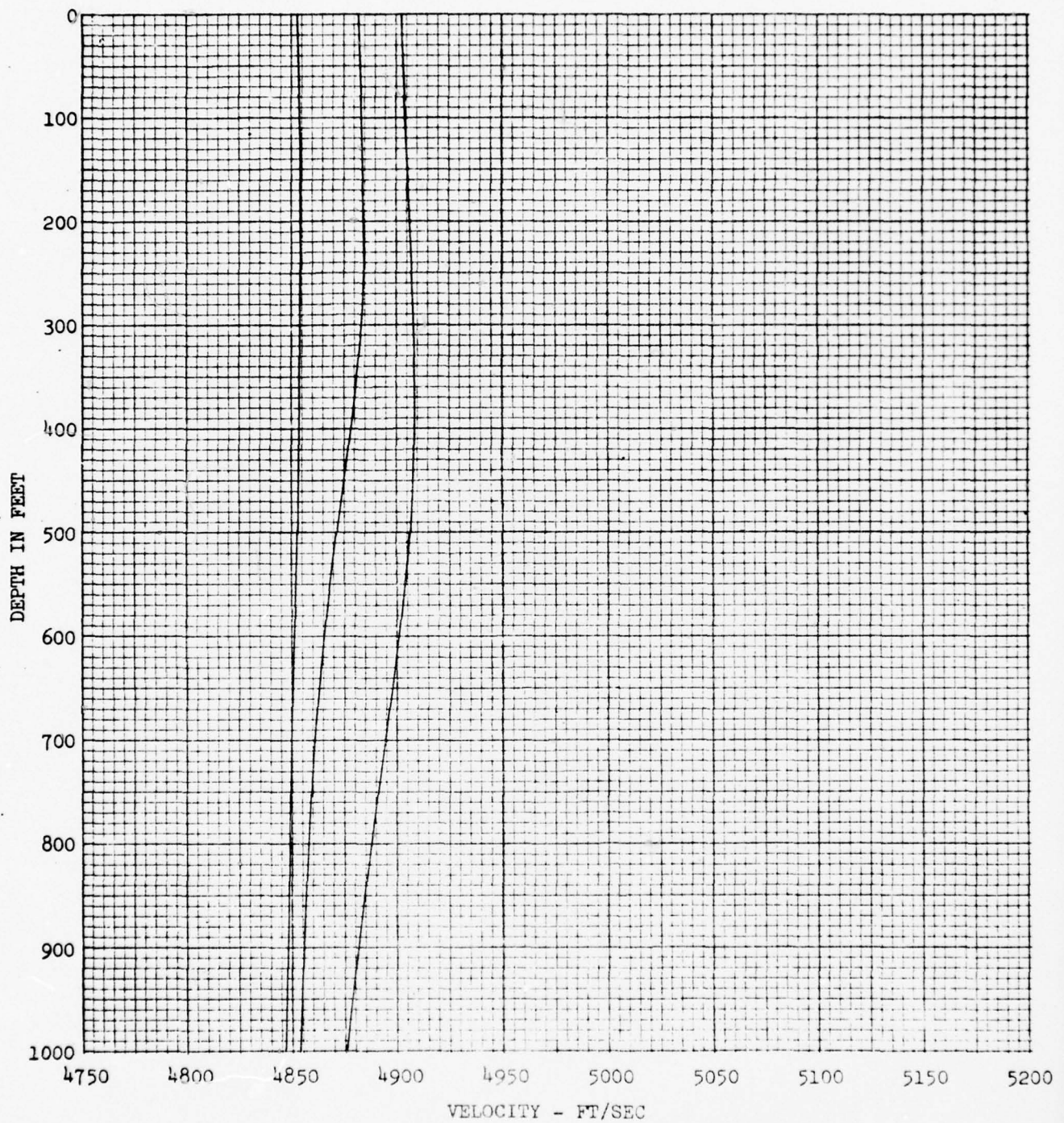


Figure II.2. Near surface sound velocity statistical quartile plot, winter.

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CONFIDENTIAL TABLE 11.111
NEAR SURFACE STATISTICAL QUANTILES

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

WINTER

[illegible]

SECTION III
SPRING STATISTICAL SUMMARY DATA

III.1

CONFIDENTIAL**TABLE III.1 ENVIRONMENTAL SUMMARY**

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: SPRING

SURFACE SOUND CHANNEL CHARACTERISTICS

ASSOCIATED GRADIENTS*

LAYER DEPTH (ZL) (FT)	IN-LAYER (γ_0) (FT/SEC/FT)	BELOW-LAYER (γ_1) (FT/SEC/FT)
-----------------------------	---	--

1ST QUARTILE 82	.0060	-.0365
MEDIAN 97	.0073	-.0378
3RD QUARTILE 118	.0089	-.0151

STATION
BTAMOUNT OF
DATA USED

11
62

PROBABILITY
OF SURFACE
CHANNEL
OCCURRENCE**55%**ENVIRONMENTAL CHARACTERISTICSSURFACE PARAMETERS

SOUND VELOCITY (CS)(FT/SEC)
TEMPERATURE (SST)(°F)
WAVE HEIGHT (LWA)(FT)
WIND VELOCITY (VWI)(KNOTS)

1ST QUARTILE	MEDIAN	3RD QUARTILE
4875.3	4888.0	4908.3
47.9	49.9	52.7
1.0	4.9	8.0
8.5	15.0	22.5

SEA FLOOR PARAMETERS

BOTTOM DEPTH (ZBM)(FT)
BOTTOM POROSITY (PORB)

8,800	10,800	11,500
.71	.76	.80

SCATTERING STRENGTH PARAMETERS

OCEAN BOTTOM (MUB)(dB/SQ YD)
LAYER (MUVL)(dB/CU YD)
VOLUME (MUV)(dB/CU YD)

-20	-17	-14
-75	-64	-52
-75	-70	-65

*Associated gradients are medians for that 50% of the data centered about the specified layer depth quartile values.

III.2

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DEEP OCEAN STATISTICAL QUARTILE PLOT

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: SPRING

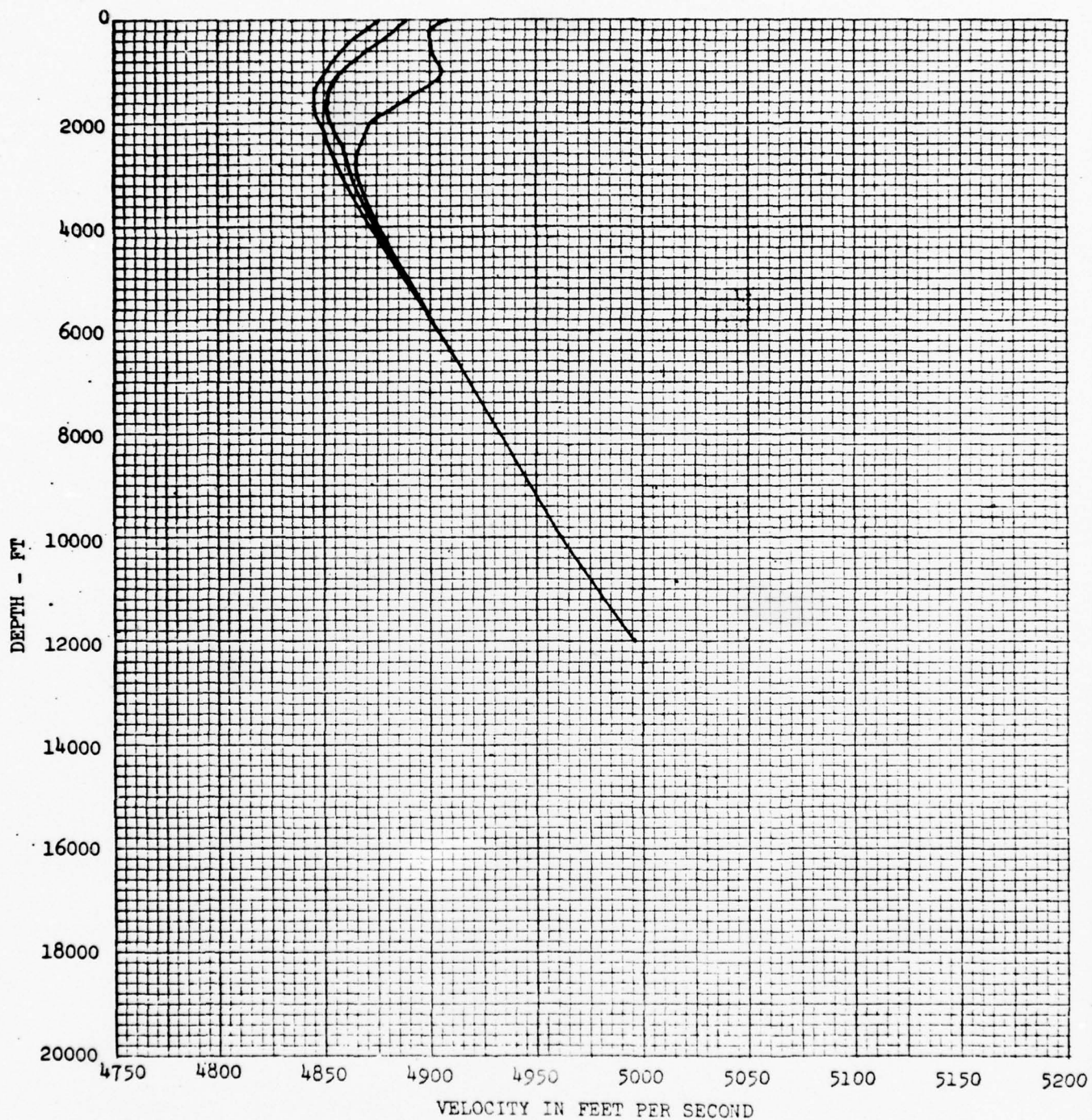


Figure III.1. Deep ocean sound velocity statistical quartile plot, spring.

CONFIDENTIAL**TABLE III.11
DEEP OCEAN STATISTICAL QUARTILES**

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: SPRING

DEPTH - FT	SOUND VELOCITY - FPS		
	1ST QUARTILE	MEDIAN	3RD QUARTILE
0	4875.3	4888.0	4908.3
200	4868.3	4882.7	4899.5
400	4863.4	4877.9	4900.2
600	4859.1	4869.6	4900.3
800	4854.3	4863.4	4902.7
1000	4851.0	4858.0	4905.5
1200	4847.9	4853.8	4901.4
1400	4845.6	4852.9	4894.6
1600	4845.4	4851.1	4887.9
1800	4846.8	4851.5	4879.4
2000	4848.5	4852.7	4871.6
2200	4850.3	4855.2	4869.7
2400	4852.1	4857.7	4867.7
2600	4853.9	4860.2	4865.5
2800	4856.1	4861.5	4865.3
3000	4858.4	4862.7	4865.7
3400	4863.4	4866.3	4868.7
3800	4868.7	4870.6	4872.6
4200	4874.7	4876.5	4877.8
4600	4881.2	4882.1	4883.5
5000	4886.7	4888.1	4889.2
5400	4892.8	4894.3	4895.1
5800	4898.9	4900.4	4901.0
6200	4904.7	4906.0	4906.6
6600	4909.6	4911.6	4912.8
7000	4916.7	4917.2	4917.9
7400	4922.6	4922.8	4923.6
7800	4928.0	4928.3	4929.2
8200	4935.3	4935.8	4936.3
8600	4941.7	4942.2	4942.3
9000	4948.1	4948.6	4949.1
10,000	4965.4	4965.6	4965.7
11,000	4980.9	4980.9	4980.9
12,000	4996.3	4996.3	4996.3

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NEAR SURFACE SOUND VELOCITY PROFILE

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: SPRING

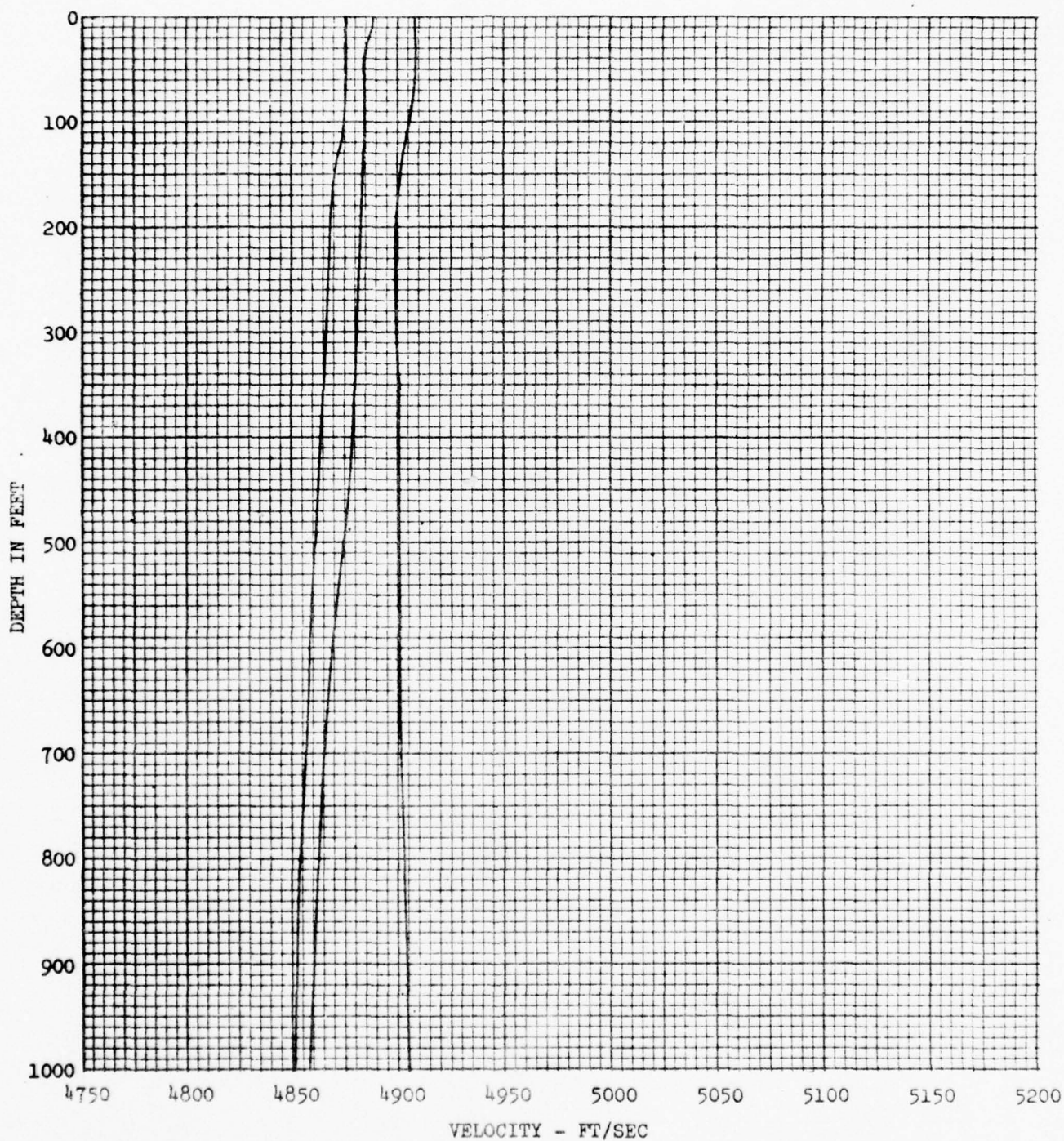


Figure III.2. Near surface sound velocity statistical quartile plot, spring.

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CONFIDENTIAL TABLE III.III
NEAR SURFACE STATISTICAL QUARTILES

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON :

SPRING

SOUND VELOCITY - FPS

[illegible]

SECTION IV
SUMMER STATISTICAL SUMMARY DATA

IV.1

CONFIDENTIAL

TABLE IV.1 ENVIRONMENTAL SUMMARY

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: SUMMER

SURFACE SOUND CHANNEL CHARACTERISTICS

ASSOCIATED GRADIENTS*

LAYER DEPTH (ZL) (FT)	IN-LAYER (γ_0) (FT/SEC/FT)	BELOW-LAYER (γ_1) (FT/SEC/FT)
-----------------------------	---	--

1ST QUARTILE		
90	.0163	-.4757
MEDIAN		
98	.0107	-.4530
3RD QUARTILE		
122	.0107	-.2493

STATION

BT

AMOUNT OF
DATA USED

41

16

PROBABILITY
OF SURFACE
CHANNEL
OCCURRENCE

51%

ENVIRONMENTAL CHARACTERISTICSSURFACE PARAMETERS

	1ST QUARTILE	MEDIAN	3RD QUARTILE
SOUND VELOCITY (CS)(FT/SEC)	4926.2	4932.3	4944.6
TEMPERATURE (SST)(°F)	56.0	57.2	59.0
WAVE HEIGHT (LWA)(FT)	2.7	5.1	8.0
WIND VELOCITY (VWI)(KNOTS)	9.0	15.0	22.5

SEA FLOOR PARAMETERS

BOTTOM DEPTH (ZBM)(FT)	8,800	10,800	11,500
BOTTOM POROSITY (PORB)	.71	.76	.80

SCATTERING STRENGTH PARAMETERS

OCEAN BOTTOM (MUB)(dB/SQ YD)	-20	-17	-14
LAYER (MUVL)(dB/CU YD)	-75	-64	-52
VOLUME (MUV)(dB/CU YD)	-75	-70	-65

*Associated gradients are medians for that 50% of the data centered about the specified layer depth quartile values.

IV.2

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DEEP OCEAN STATISTICAL QUARTILE PLOT

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: SUMMER

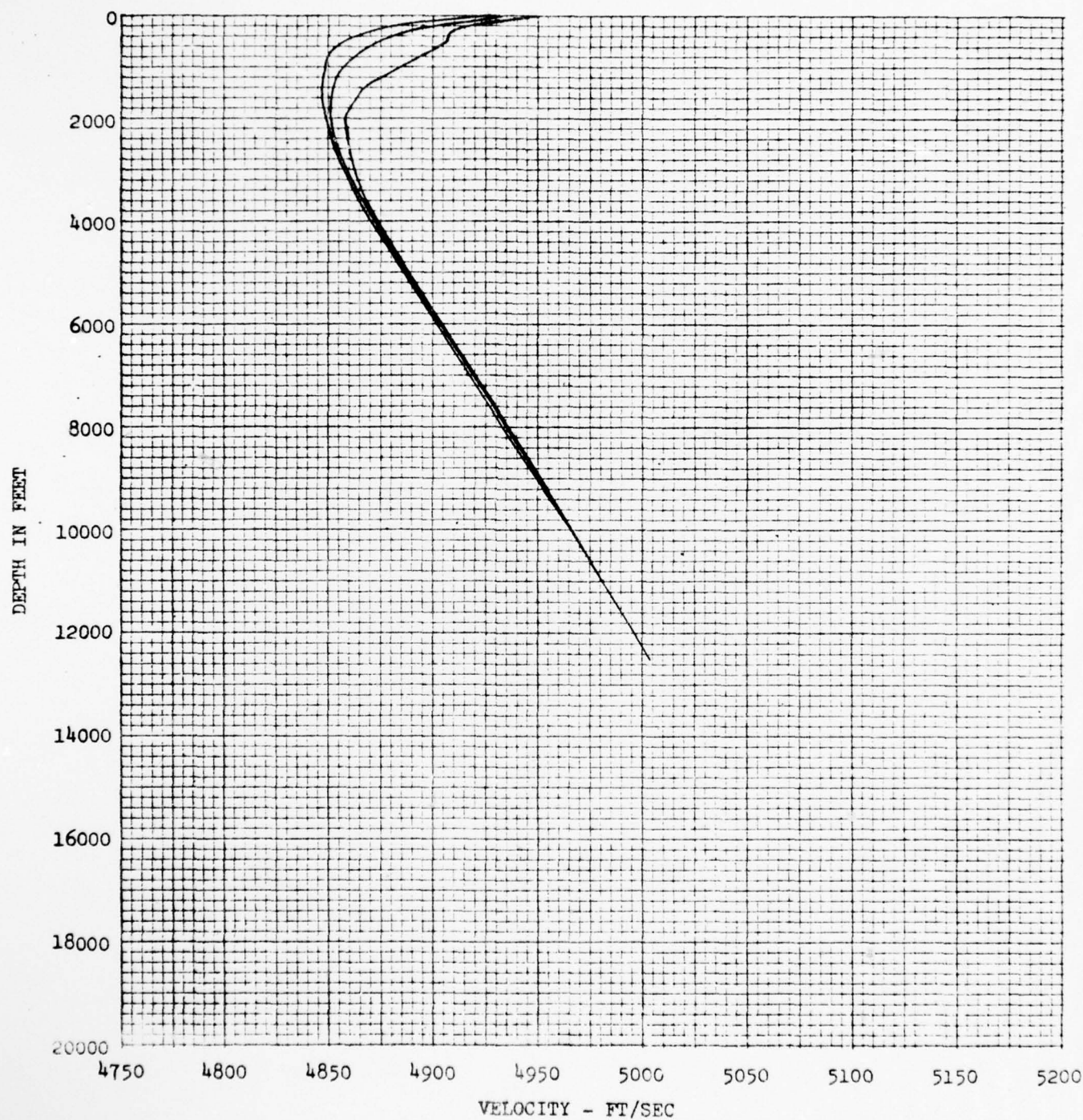


Figure IV.1. Deep ocean sound velocity statistical quartile plot, summer.

IV.3

CONFIDENTIAL

CONFIDENTIAL**TABLE IV.11
DEEP OCEAN STATISTICAL QUANTILES**

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: SUMMER

DEPTH - FT	SOUND VELOCITY - FPS		
	1ST QUANTILE	MEDIAN	3RD QUANTILE
0	4926.2	4932.3	4944.6
200	4882.3	4898.3	4916.1
400	4864.3	4879.3	4906.7
600	4854.0	4869.2	4902.6
800	4850.0	4862.6	4893.9
1000	4849.0	4858.1	4885.2
1200	4848.2	4853.7	4874.5
1400	4847.5	4852.1	4866.9
1600	4846.9	4851.7	4863.7
1800	4848.0	4851.6	4860.6
2000	4849.5	4851.7	4857.9
2200	4850.6	4852.2	4858.5
2400	4851.9	4853.2	4859.1
2600	4853.5	4854.4	4860.0
2800	4855.7	4856.5	4861.1
3000	4858.1	4858.7	4862.3
3400	4862.9	4863.6	4865.6
3800	4868.5	4869.1	4870.8
4200	4874.5	4874.9	4876.4
4600	4880.5	4880.8	4882.3
5000	4886.6	4887.0	4888.1
5400	4892.9	4893.6	4894.3
5800	4899.2	4900.1	4900.6
6200	4905.4	4906.5	4907.1
6600	4911.8	4913.0	4913.5
7000	4917.7	4919.2	4919.8
7400	4923.8	4925.4	4926.1
7800	4929.8	4931.6	4932.4
8200	4935.8	4937.8	4938.7
8600	4942.4	4944.0	4944.8
9000	4949.0	4950.2	4951.0
10,000	4965.6	4965.7	4965.8
11,000	4980.9	4981.0	4981.1
12,000	4996.3	4996.3	4996.3

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NEAR SURFACE SOUND VELOCITY PROFILE

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: SUMMER

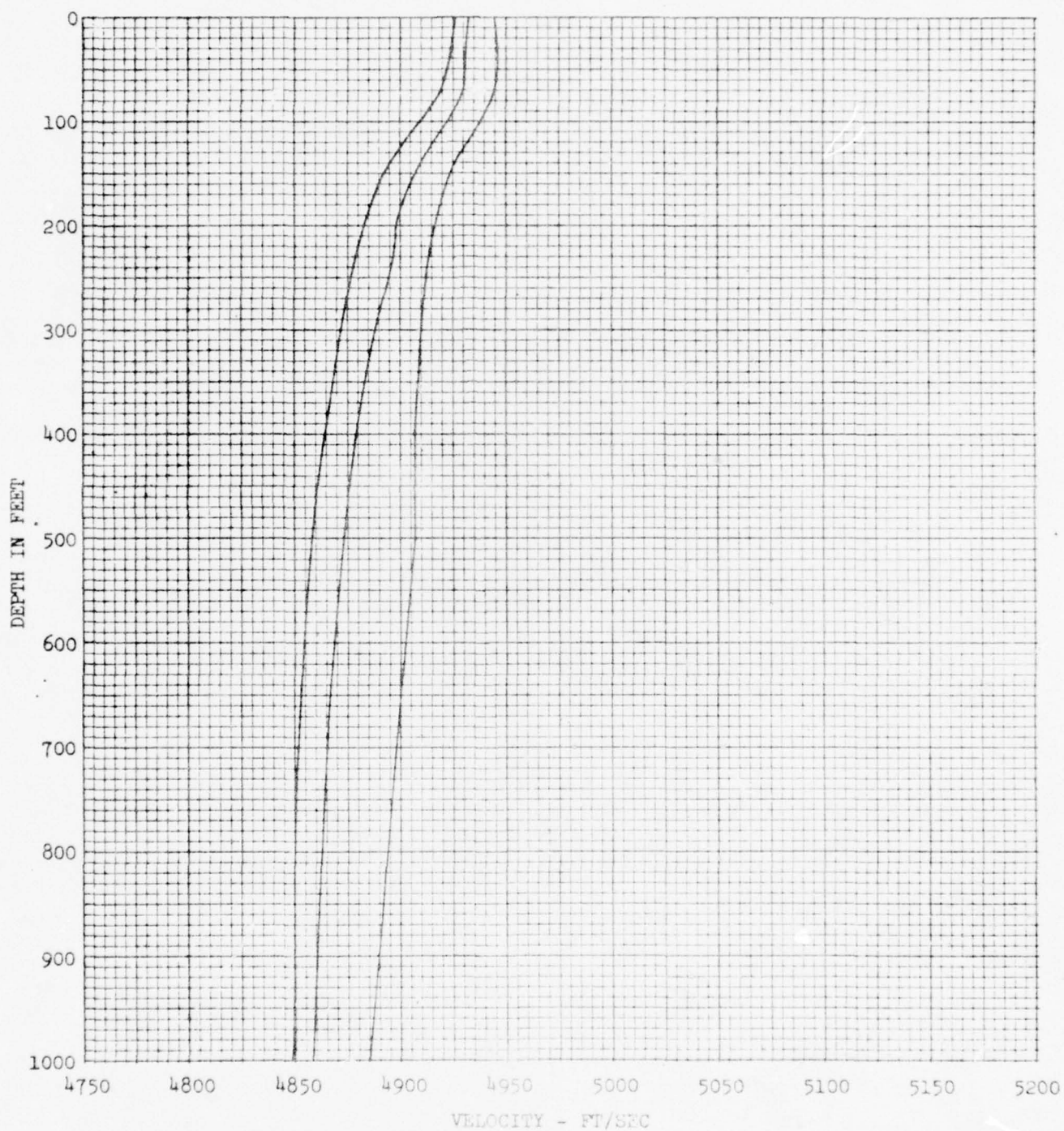


Figure IV.2. Near surface sound velocity statistical quartile plot, winter.

IV.5

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CONFIDENTIAL TABLE IV.111
NEAR SURFACE STATISTICAL QUANTILES

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: SUMMER

DEPTH - FT	SOUND VELOCITY - FPS		
	1ST QUARTILE	MEDIAN	3RD QUARTILE
0	4926.2	4932.3	4944.6
20	4924.3	4931.5	4945.3
40	4922.6	4930.8	4945.8
60	4921.4	4930.4	4945.7
80	4916.1	4927.3	4942.8
100	4909.0	4922.7	4938.5
150	4891.8	4905.6	4923.6
200	4882.3	4898.3	4916.1
250	4875.9	4894.5	4911.6
300	4871.8	4888.0	4909.9
350	4868.0	4882.8	4908.3
400	4864.3	4879.3	4906.7
450	4861.2	4875.8	4906.8
500	4858.4	4872.6	4907.0
600	4854.0	4869.1	4902.6
700	4851.1	4865.8	4898.2
800	4850.0	4862.6	4893.9
900	4849.4	4860.3	4889.6
1000	4849.0	4858.1	4885.2

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SECTION V
FALL STATISTICAL SUMMARY DATA

CONFIDENTIAL

TABLE V.1 ENVIRONMENTAL SUMMARY

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: FALL

SURFACE SOUND CHANNEL CHARACTERISTICS

ASSOCIATED GRADIENTS*
LAYER DEPTH IN-LAYER BELOW-LAYER
(ZL) (Y₀) (Y₁)
(FT) (FT/SEC/FT) (FT/SEC/FT)

1ST QUARTILE		
283	.0165	-.0911
MEDIAN		
342	.0179	-.0673
3RD QUARTILE		
465	.0179	-.0775

STATION

AMOUNT OF
DATA USED

11

BT

14

PROBABILITY
OF SURFACE
CHANNEL
OCCURRENCE

>90%

ENVIRONMENTAL CHARACTERISTICS

SURFACE PARAMETERS

SOUND VELOCITY (CS)(FT/SEC)
TEMPERATURE (SST)(°F)
WAVE HEIGHT (LWA)(FT)
WIND VELOCITY (VWI)(KNOTS)

1ST QUARTILE	MEDIAN	3RD QUARTILE
4885.4	4889.3	4900.7
49.5	50.3	52.5
4.0	8.0	11.3
13.2	21.0	28.2

SEA FLOOR PARAMETERS

BOTTOM DEPTH (ZBM)(FT)
BOTTOM POROSITY (PORB)

8,800	10,800	11,500
.71	.76	.80

SCATTERING STRENGTH PARAMETERS

OCEAN BOTTOM (MUB)(dB/SQ YD)
LAYER (MUVL)(dB/CU YD)
VOLUME (MUV)(dB/CU YD)

-20	-17	-14
-75	-66	-57
-75	-70	-65

*Associated gradients are medians for that 50% of the data centered about the specified layer depth quartile values.

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DEEP OCEAN STATISTICAL QUARTILE PLOT

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: FALL

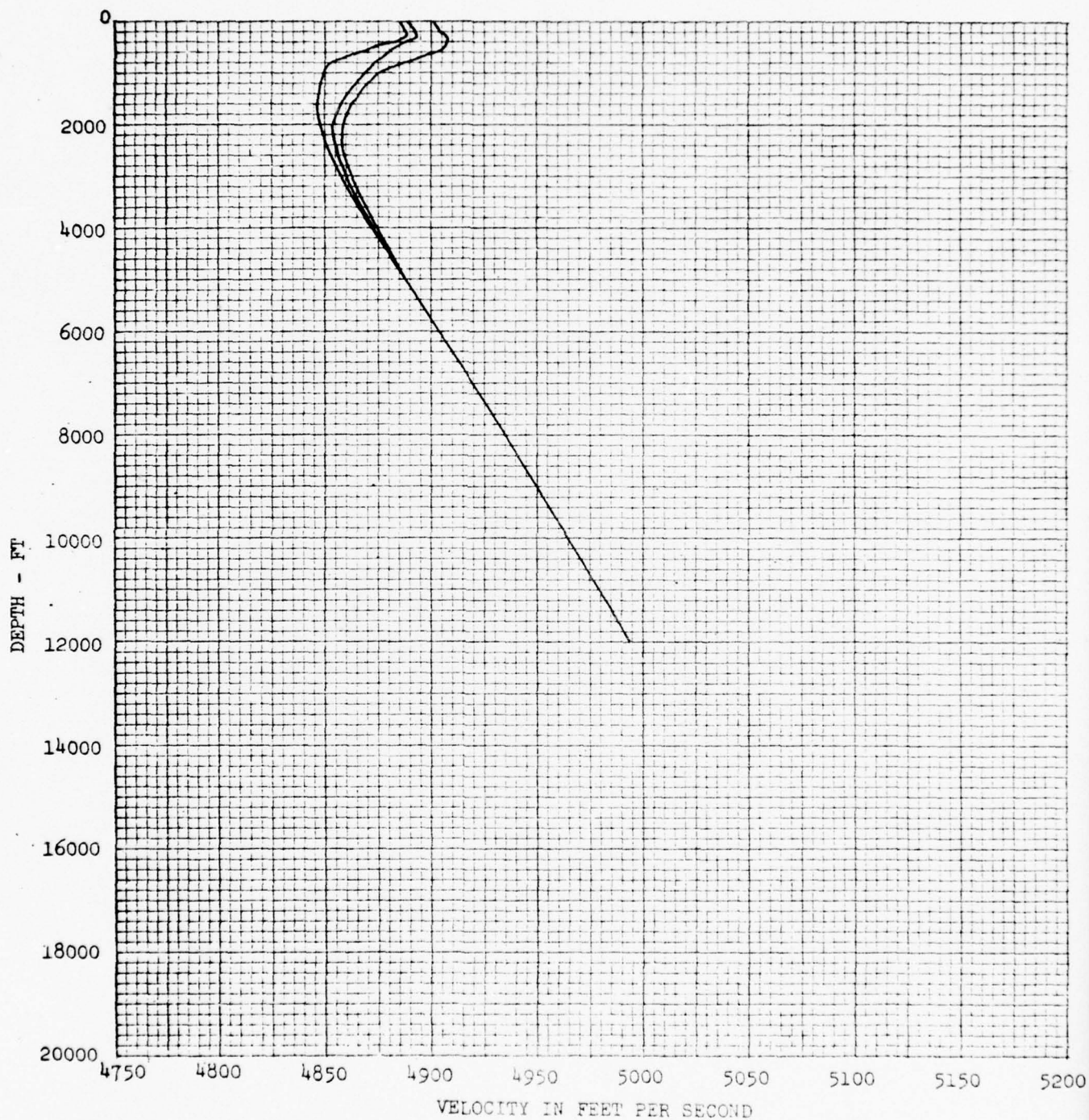


Figure V.1. Deep ocean sound velocity statistical quartile summary, fall.

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TABLE V.11

DEEP OCEAN STATISTICAL QUARTILES

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON:

FALL

DEPTH - FT	SOUND VELOCITY - FPS		
	1ST QUARTILE	MEDIAN	3RD QUARTILE
0	4885.4	4889.3	4900.7
200	4888.4	4891.8	4903.8
400	4882.8	4888.3	4907.4
600	4865.9	4879.7	4900.5
800	4853.4	4873.7	4886.9
1000	4849.3	4868.7	4874.7
1200	4847.8	4863.9	4869.0
1400	4846.7	4861.1	4865.5
1600	4846.6	4858.7	4862.6
1800	4847.3	4855.8	4860.3
2000	4848.1	4853.7	4858.4
2200	4849.3	4854.5	4857.8
2400	4850.8	4855.3	4858.0
2600	4852.7	4856.1	4859.2
2800	4855.2	4857.6	4861.2
3000	4857.8	4859.3	4863.3
3400	4863.2	4864.0	4867.7
3800	4868.6	4869.3	4872.0
4200	4874.3	4874.9	4876.5
4600	4880.7	4881.0	4881.9
5000	4886.3	4887.3	4888.1
5400	4892.4	4893.8	4894.6
5800	4898.6	4900.2	4901.1
6200	4905.1	4906.9	4907.9
6600	4910.3	4913.5	4915.8
7000	4916.4	4919.5	4921.6
7400	4922.5	4925.6	4927.5
7800	4928.6	4931.6	4933.3
8200	4934.7	4937.6	4939.1
8600	4941.7	4943.6	4945.2
9000	4948.7	4949.7	4951.4
10,000	4964.7	4964.7	4964.7
11,000	4979.5	4979.5	4979.5
12,000	4994.2	4994.2	4994.2

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NEAR SURFACE SOUND VELOCITY PROFILE

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: FALL

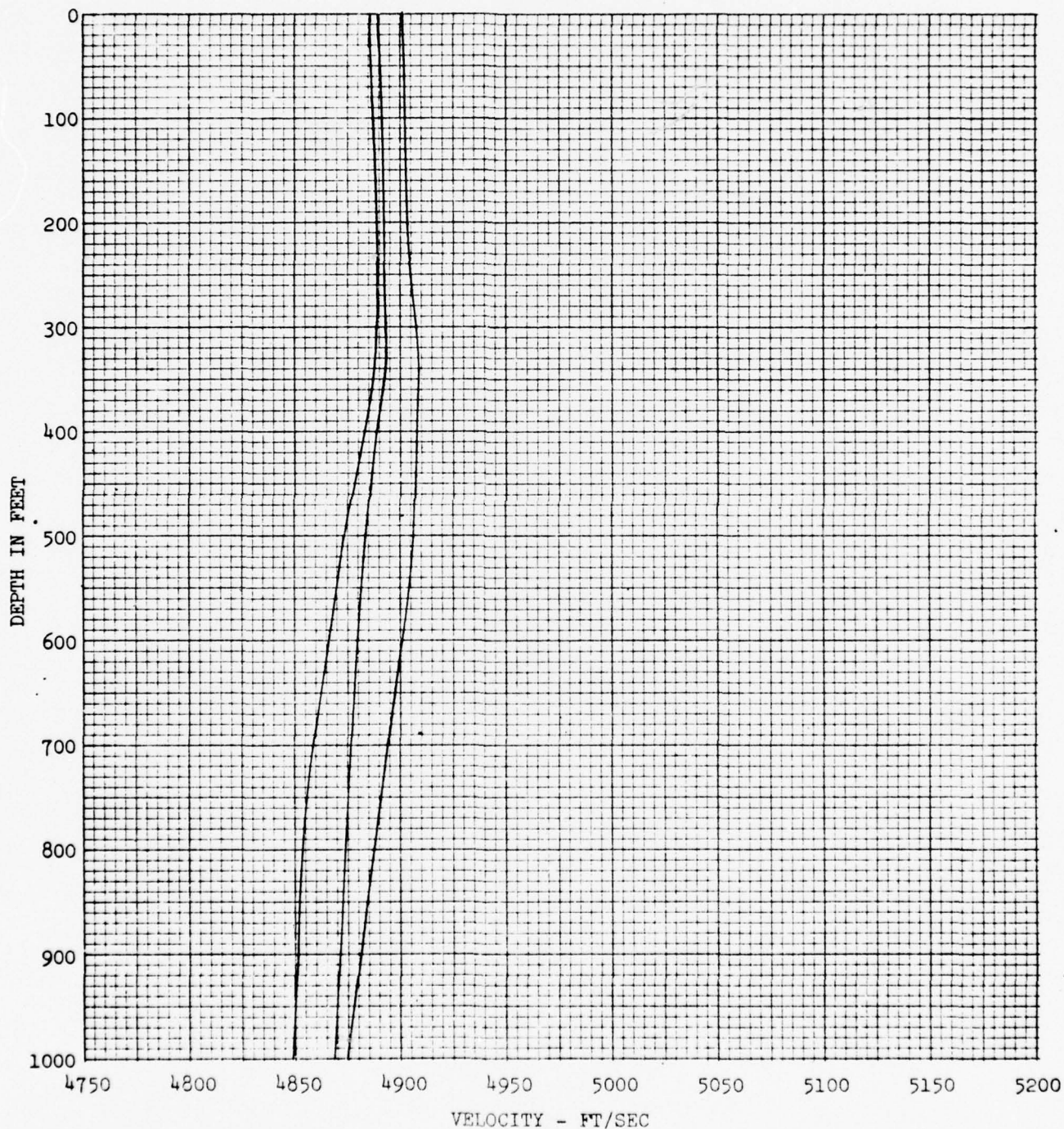


Figure V.2. Near surface sound velocity statistical quartile plot, fall.

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CONFIDENTIAL TABLE V. III
NEAR SURFACE STATISTICAL QUANTILES

NEAR SURFACE STATISTICAL QUARTILES

SEASON: FALL

[illegible]

SECTION VI
MEASURED DATA

VI.1

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MEASURED VELOCITY PROFILES

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: WINTER

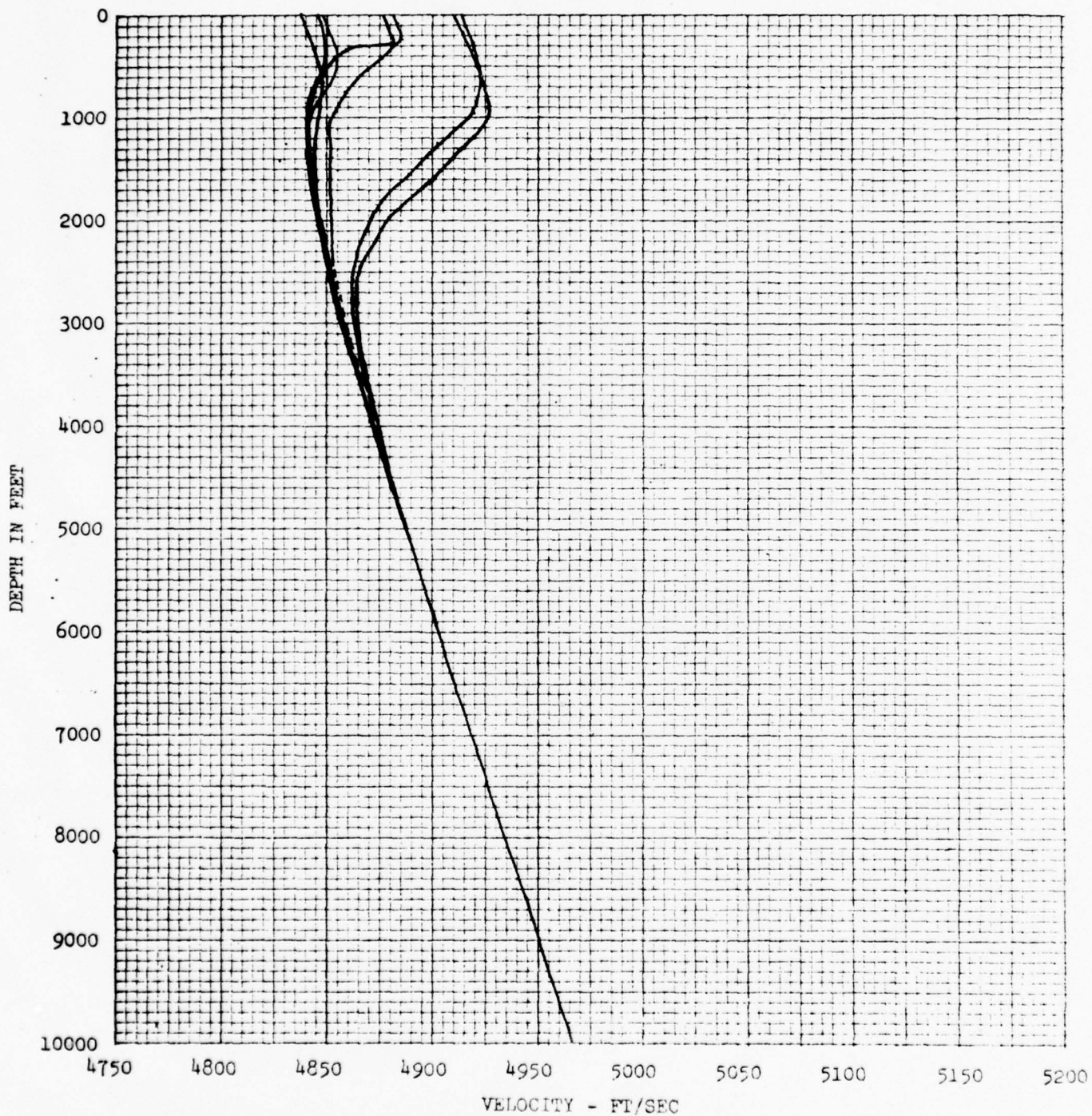


Figure VI.1. Measured sound velocity profiles from station data, winter.

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MEASURED BATHYTHERMOGRAPH PLOTS

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: WINTER

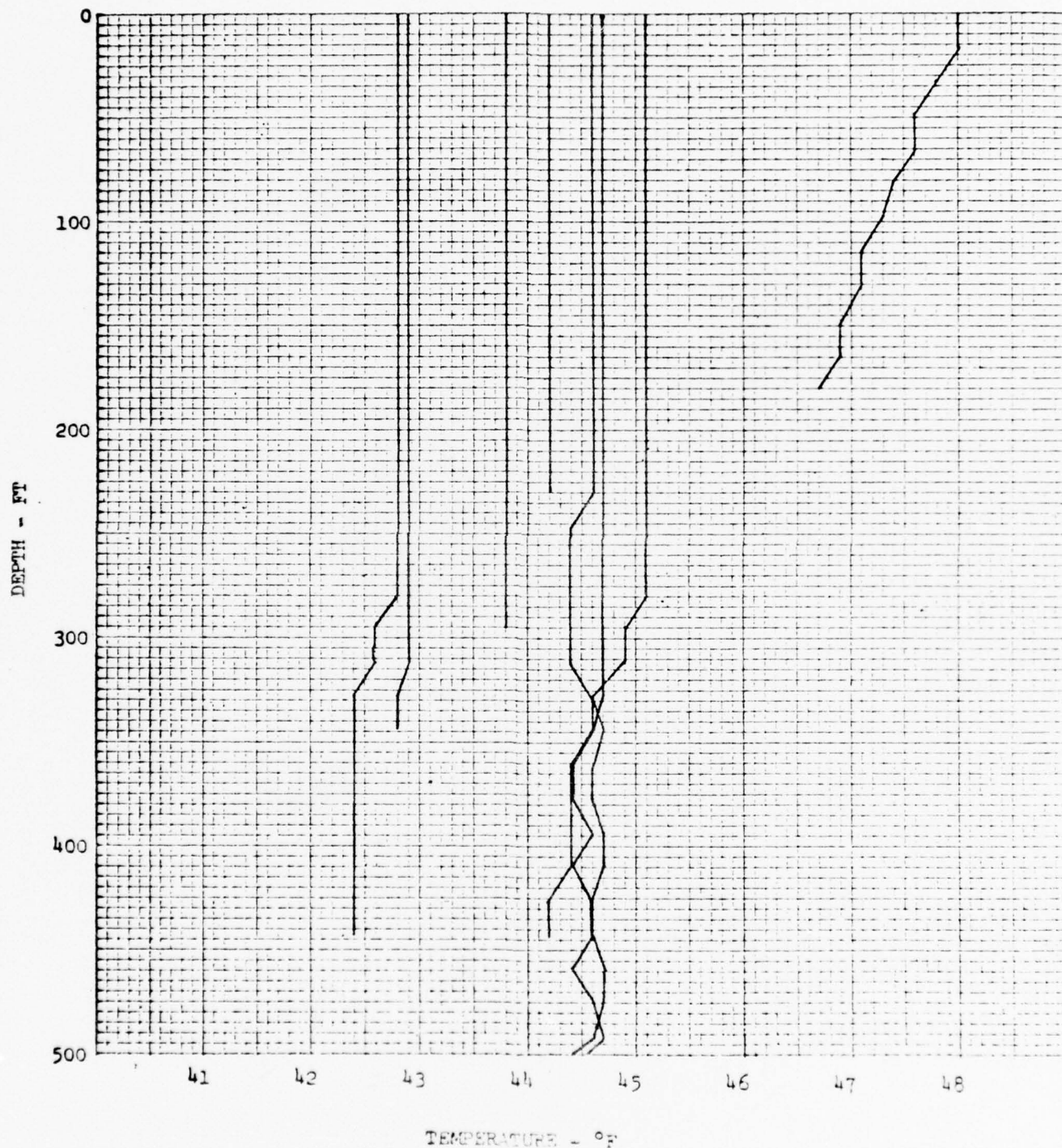


Figure VI.2. Measured BT soundings, winter.

VI.3

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MEASURED VELOCITY PROFILES

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: SPRING

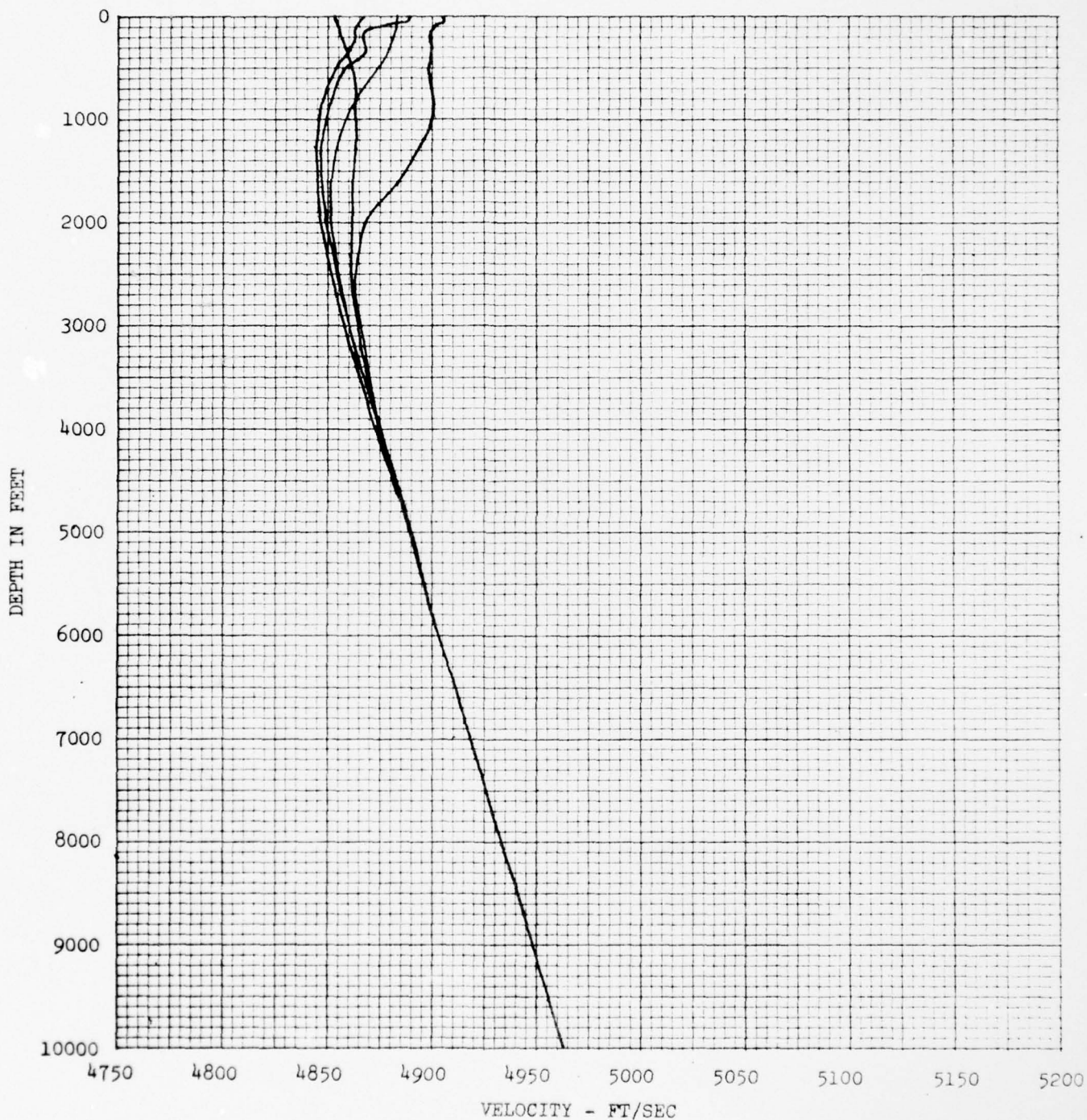


Figure VI.3. Measured sound velocity profiles from station data, spring.

VI.4

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MEASURED BATHYTHERMOGRAPH PLOTS

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: SPRING



Figure VI.4. Measured BT soundings, spring.

VI.5

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MEASURED VELOCITY PROFILES

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: SUMMER

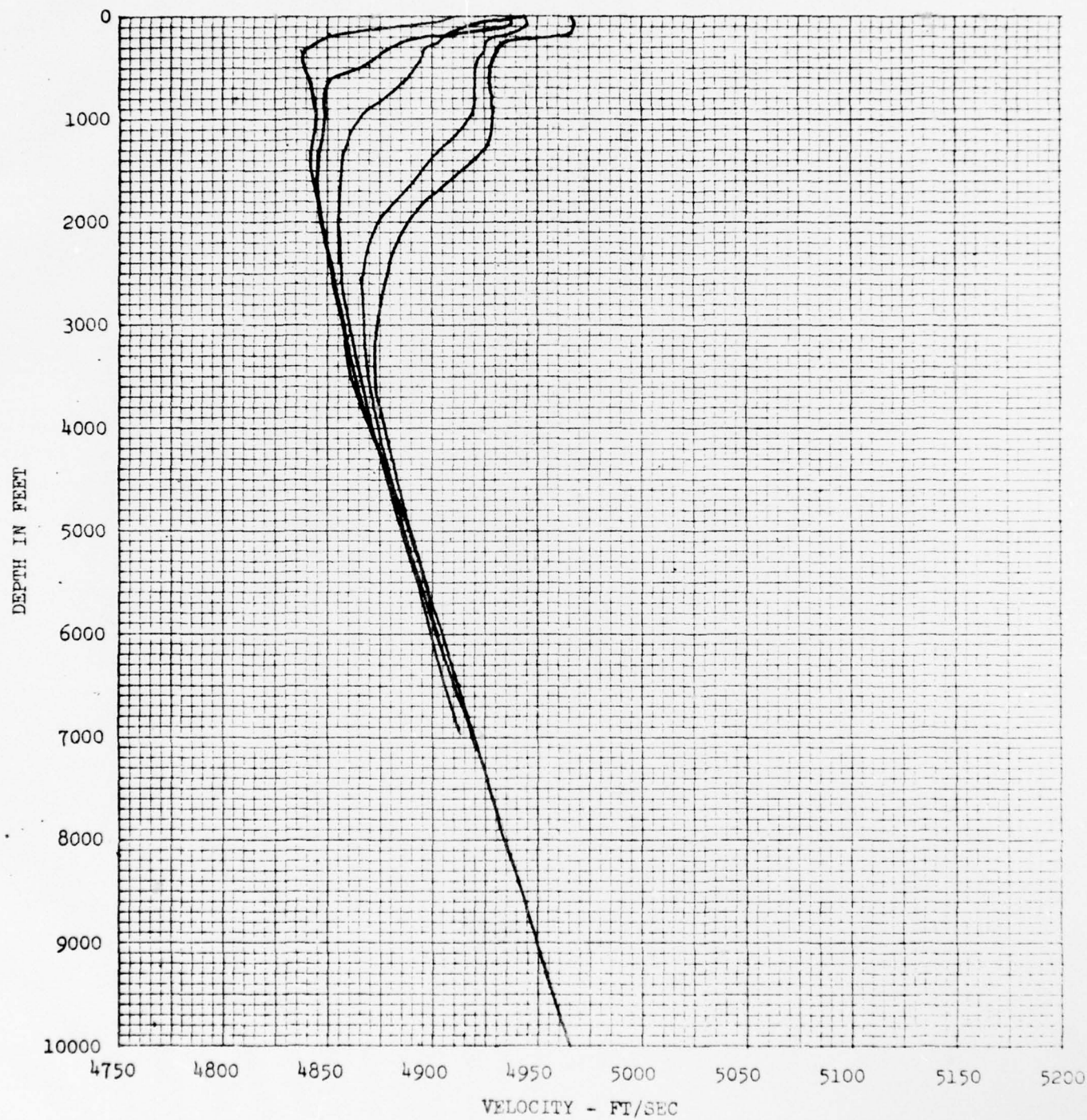


Figure VI.5. Measured sound velocity profiles from station data, summer.

VI.6

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MEASURED BATHYTHERMOGRAPH PLOTS

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: SUMMER

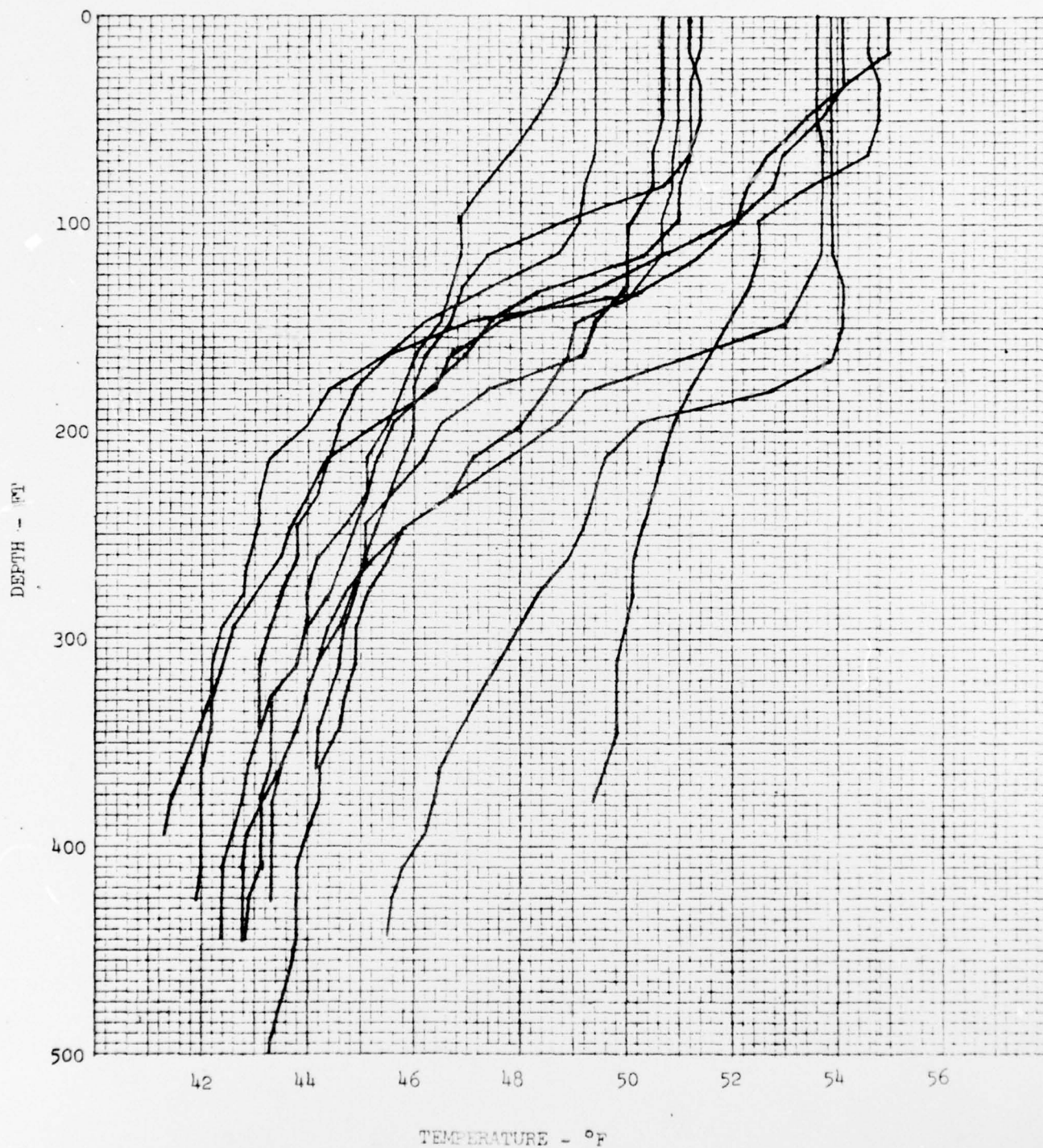


Figure VI.6. Measured BT soundings, summer.

VI.7

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MEASURED VELOCITY PROFILES

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: FALL

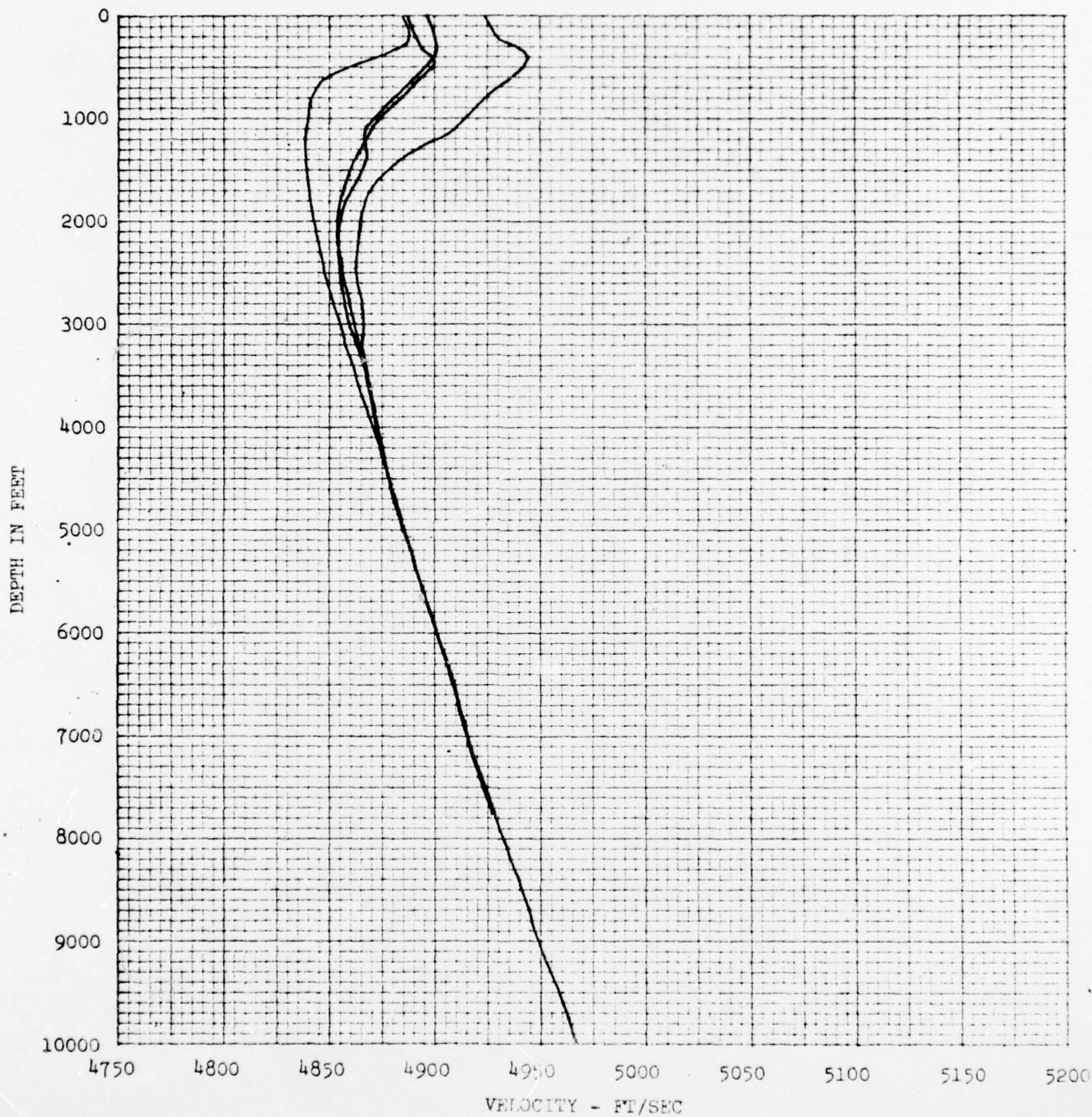


Figure VI.7. Measured sound velocity profiles from station data, fall.

VI.8

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MEASURED BATHYTHERMOGRAPH PLOTS

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: FALL



TEMPERATURE - °F

Figure VI.8. Measured BT soundings, fall.

VI.9

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SECTION VII
DATA DISTRIBUTION

VII.1

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OCEANOGRAPHIC STATION AND BT DATA DISTRIBUTION
BY MONTH AND YEAR

	<u>Month</u>	<u>Year</u>	<u>No. of Stations</u>	
			<u>NC</u>	<u>BT</u>
WINTER	1	62	1	
	2	58		1
	2	62	4	
	3	57		5
	3	58	26	2
	3	60		1
	3	64		4
TOTAL			31	13
SPRING	4	56		23
	4	58	1	
	4	64		1
	5	56		12
	5	57		3
	5	59	3	19
	5	60		1
	6	47	3	
	6	58		1
	6	60		2
TOTAL			7	62
SUMMER	7	31	1	
	7	51	1	
	7	55		1
	7	60		4
	7	61		2
	7	66		4
	8	54	3	
	8	55	3	
	8	57	4	
	8	58	19	
	8	59		3
	8	61		2
	9	58	5	
TOTAL			36	16
FALL	10	56		1
	10	58	7	
	10	59		2
	10	60		1
	11	58		3
	12	56		1
	12	58	2	
	12	60		6
TOTAL			9	14

VII.2

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DATA DISTRIBUTION

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: WINTER

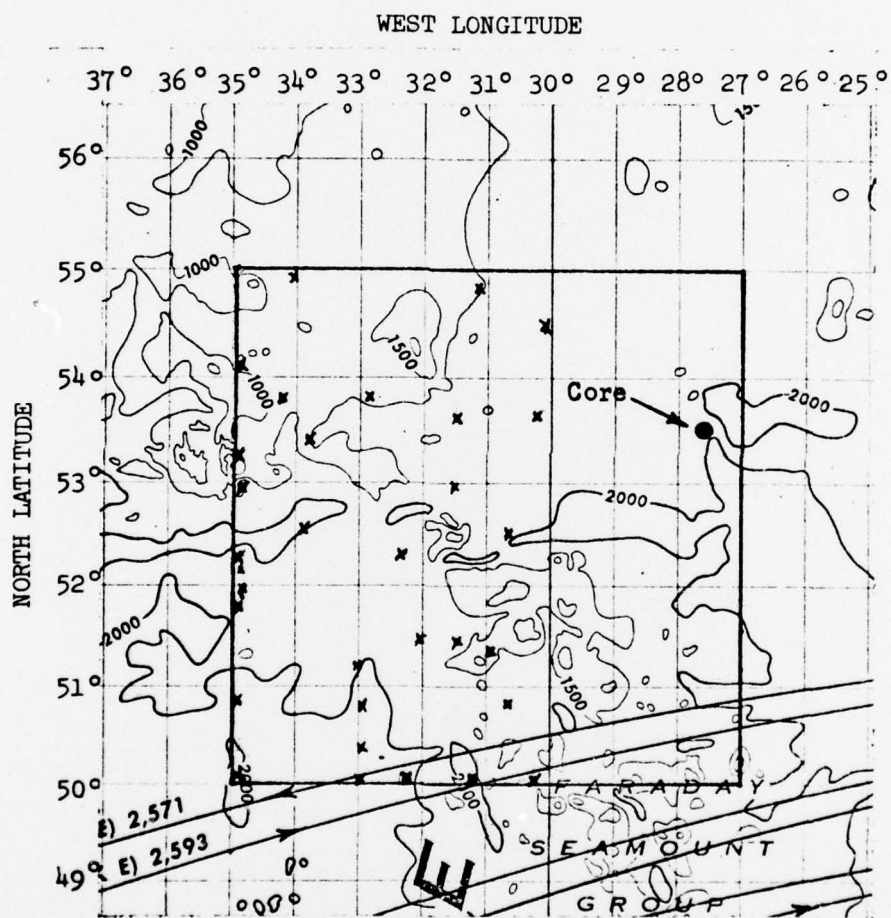


Figure VII.1. Station data distribution, winter.

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DATA DISTRIBUTION

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: SUMMER

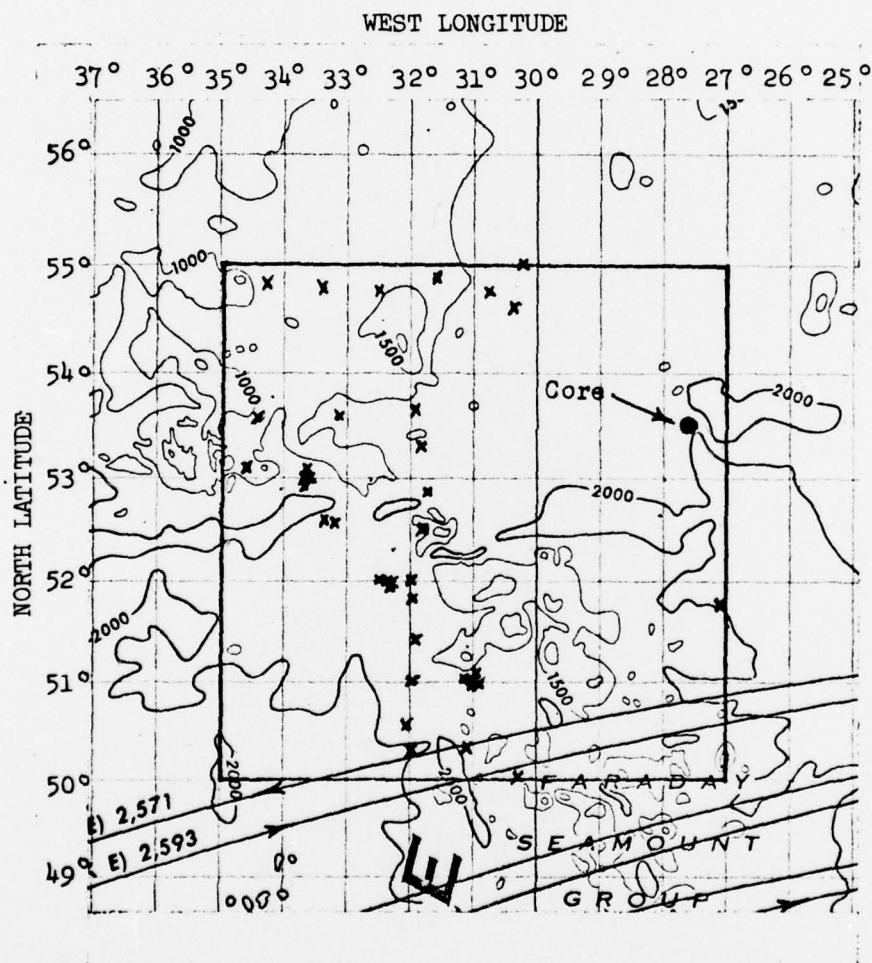


Figure VII.3. Station data distribution, summer

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DATA DISTRIBUTION

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

SEASON: FALL

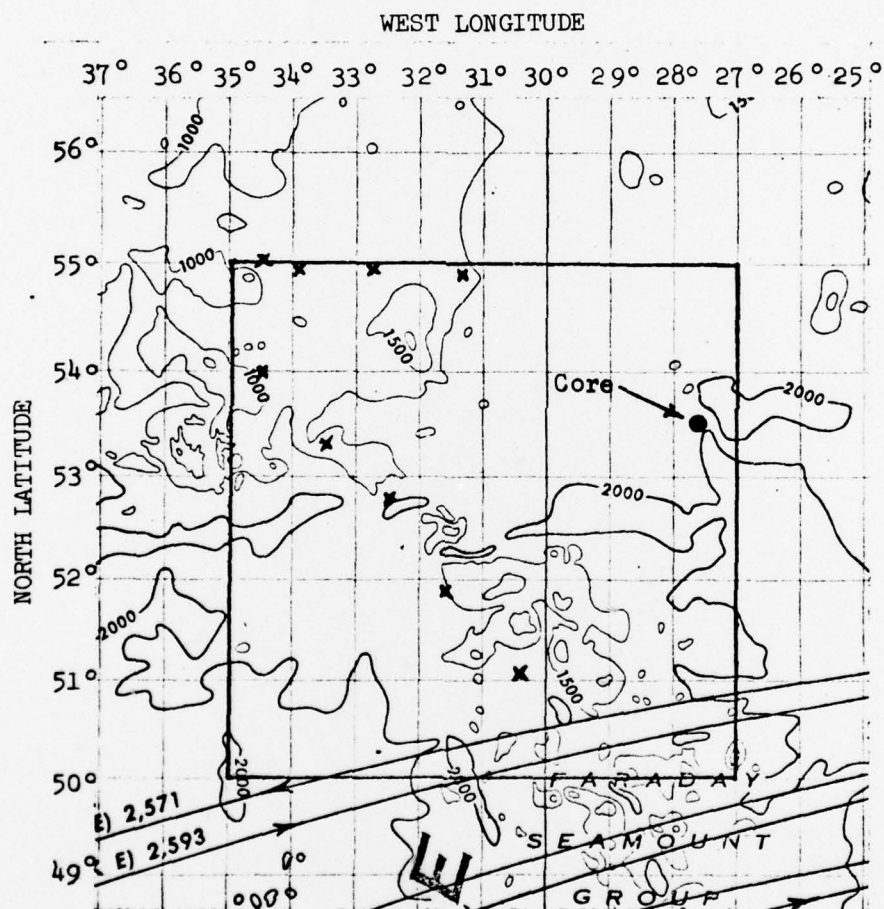


Figure VII.4. Station data distribution, fall.

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SECTION VIII
SEA FLOOR SUMMARY DATA

VIII.1

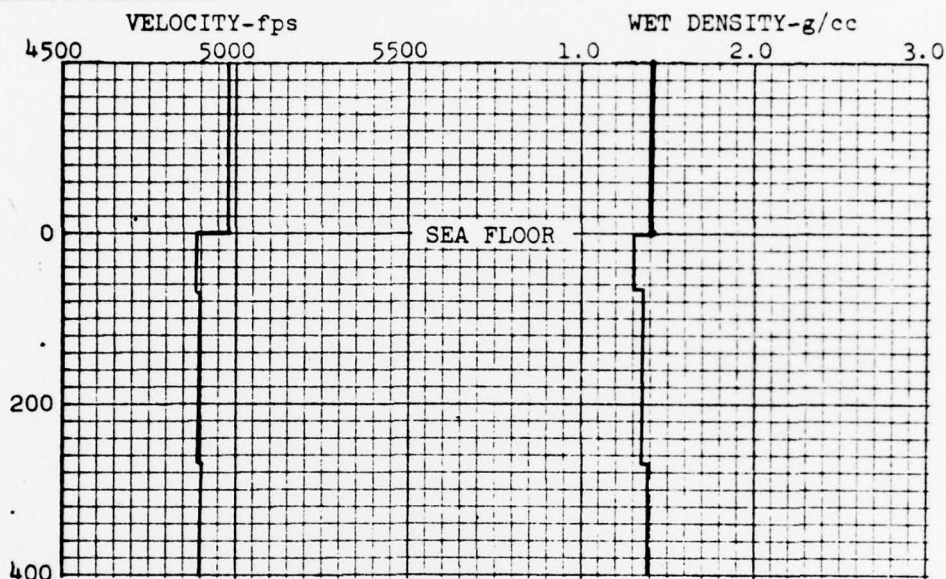
CONFIDENTIAL ACOUSTIC SEA FLOOR SUMMARY

LOCATION/AREA: NA-2 50°-55°N x 30°-35°W

PROVINCE: MID ATLANTIC RIDGE

DATA SOURCE: MGS AREA 2, VOLUME 6 T.I. INC., CORE AS2-8

I. DEPTH DISTRIBUTION:



II. LAYER CHARACTERISTICS:

LAYER NUMBER	MATERIAL	LAYER DEPTH-cm*	LAYER THICKNESS cm	VELOCITY fps	POROSITY	WET DENSITY g/cc
1	Chalk	0	70	4877	.80	1.33
2	Clay	70	200	4872	.76	1.38
3	Chalk	270	178	4898	.73	1.43
4	Clay	450	260	4867	.71	1.47

III. SEA FLOOR INTERFACE VALUES:

BOTTOM WATER VELOCITY - fps	4977.6
BOTTOM WATER DENSITY - g/cc	1.0419
SURFACE SEDIMENT DENSITY - g/cc	1.33
SURFACE SEDIMENT TO BOTTOM WATER VELOCITY RATIO	0.9797
BOTTOM DEPTH - ft	10,800

*DEPTH TO UPPER SURFACE OF LAYER

Figure VIII.1. Ocean bottom and sediment characteristics.

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CORE SAMPLE ANALYSIS

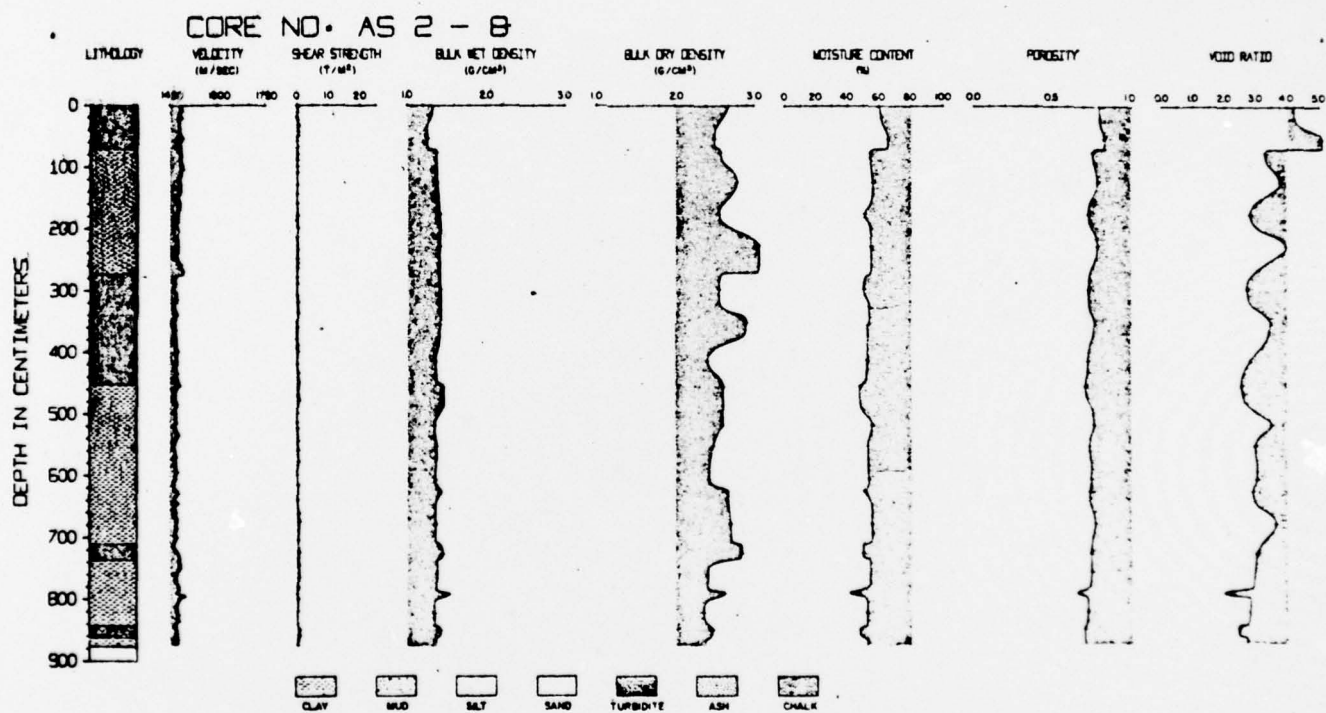


Figure VIII.2. Marine Geophysical Survey Area 2 Core No. AS2-8.

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SECTION IX
REFERENCES

IX.1

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